WHAT IS CLAIMED IS:

1. A method for determining the effect of an agent on cell proliferation, comprising:

contacting a cell containing a *Renilla* luciferase polypeptide or a polynucleotide encoding a *Renilla* luciferase with an agent suspected of modulating cell proliferation under conditions that allow the agent and the cell to interact; and

comparing the light emission data from the cell to the light emission data from the cell in the absence of the agent, wherein a difference in light emission data is indicative of an effect on cell proliferation.

2. The method of claim 1, wherein the cell is a prokaryotic cell.

3. The method of claim 1, wherein the cell is a eukaryotic cell.

4. The method of claim 3, wherein the eukaryotic cell is a mammalian cell.

5. The method of claim 4, wherein the mammalian cell is a human cell.

6. The method of claim 1, wherein the cell is a cancer cell.

7. The method of claim 1, wherein the cell contains a transgene encoding *Renilla* luciferase.

8. The method of claim 7, wherein the cell is a HeLa cell.

9. The method of claim 1, wherein the agent is selected from the group consisting of a peptide, a protein, a chemical, a nucleic acid sequence, a small molecule, and a biological agent.

10. The method of claim 9, wherein the chemical is a drug.

11. The method of claim 10, wherein the drug is an antibiotic.

12. The method of claim 10, wherein the drug is a chemotherapeutic drug.

13. The method of claim 1, wherein the cell is obtained from a subject.

14. The method of claim 13, wherein the subject is a mammal.

15. The method of claim 14, wherein the mammal is a human.

16. The method of claim 1, wherein the modulation is inhibition of cell proliferation.

17. The method of claim 1, wherein the modulation is stimulation of cell proliferation.

18. A method for determining cell proliferation of a cell or population of cells comprising:

obtaining light emission data from a cell containing a *Renilla* luciferase over a period of time wherein a change in light emission data is indicative of proliferation.

19. The method of claim 18, wherein the cell is a prokaryotic cell.

20. The method of claim 18, wherein the cell is a eukaryotic cell.

21. The method of claim 20, wherein the eukaryotic cell is a mammalian cell.

22. The method of claim 21, wherein the mammalian cell is a human cell.

23. The method of claim 18, wherein the cell is a cancer cell.

24. The method of claim 18, wherein the cell is in a culture of cells.

25. The method of claim 18, wherein the cell contains a transgene encoding *Renilla* luciferase.

26. The method of claim 25, wherein the cell is a HeLa cell.

27. The method of claim 18, wherein the cell is obtained from a subject.

28. The method of claim 27, wherein the subject is a mammal.

29. The method of claim 28, wherein the mammal is a human.

30. The method of claim 18, wherein the cell is obtained from a tissue sample.

31. A method for determining the effect of an agent on cell proliferation, the method comprising:

transfecting a cell obtained from a sample with a vector containing a polynucleotide sequence encoding a *Renilla* luciferase;

contacting the transfected cell with an agent suspected of modulating cell proliferation under conditions that allow the agent and the cell to interact; and

comparing the light emission data from the cell to the light emission data from the cell in the absence of the agent, wherein a difference in light emission data is indicative of an effect on cell proliferation..

32. The method of claim 31, wherein the cell is a prokaryotic cell.

33. The method of claim 31, wherein the cell is a eukaryotic cell.

34. The method of claim 33, wherein the eukaryotic cell is a mammalian cell.

35. The method of claim 34, wherein the mammalian cell is a human cell.

36. The method of claim 31, wherein the cell is a cancer cell.

37. The method of claim 31, wherein the sample is obtained from a subject.

38. The method of claim 37, wherein the subject is a mammal.

39. The method of claim 38, wherein the mammal is a human.

40. The method of claim 31, wherein the sample is a biological sample.

41. The method of claim 40, wherein the biological sample is selected from the group consisting of a blood sample, a urine sample, a stool sample, and a tissue sample.

42. The method of claim 31, wherein the agent is selected from the group consisting of a peptide, a protein, a chemical, a nucleic acid sequence, a small molecule and a biological agent.

43. The method of claim 42, wherein the chemical is a drug.

44. The method of claim 43, wherein the drug is an antibiotic.

45. The method of claim 43, wherein the drug is a chemotherapeutic drug.

46. The method of claim 31, wherein the modulating is inhibition of cell proliferation.

47. The method of claim 31, wherein the modulating is stimulation of cell proliferation.

48. A vector containing a polynucleotide sequence encoding a *Renilla* luciferase for expression in a eukaryotic organism.

49. A eukaryotic host cell containing an expression vector encoding *Renilla* luciferase.

50. The host cell of claim 49, wherein the host cell is a mammalian cell.

51. The host cell of claim 50, wherein the mammalian cell is a human cell.

52. The host cell of claim 51, wherein the human cell is a HeLa cell.

53. The host cell of claim 52, wherein the HeLa cell has ATCC accession number X.

54. The host cell of claim 49, wherein the cell is stably transfected with the *Renilla* luciferase.

55. The host cell of claim 49, wherein the cell is transiently transfected with the *Renilla* luciferase.

56. A method of diagnosing a cell proliferative disorder, comprising:

transfecting a cell obtained from a subject with a vector containing a polynucleotide encoding a *Renilla* luciferase;

obtaining light emission data from the cell over a period of time; and

comparing the light emission data from the cell to light emission data from a cell which does not have a cell proliferative disorder, wherein a difference in light emission is indicative of a cell proliferative disorder.

57. The method of claim 56, wherein the cell proliferative disorder is a neoplasm or a cancer.

58. The method of claim 56, wherein the cell is obtained from a tissue.

59. The method of claim 56, wherein the cell is a mammalian cell.

60. The method of claim 59, wherein the mammalian cell is a human cell.

61. The method of claim 56, wherein the light emission data is obtained continuously over a period of time.

62. The method of claim 56, wherein the light emission data is obtained at two or more time points.

63. A method of screening mammalian cells to determine their susceptibility to treatment with an agent, comprising:

contacting cells containing a *Renilla* luciferase with an agent; and

measuring light emissions from the cells in the presence and absence of the agent, wherein a difference in light emissions is indicative of an agent which affects cell proliferation.

64. The method of claim 63, wherein the cells are obtained from a subject.

65. The method of claim 64, wherein the subject is a human.

66. The method of claim 63, wherein the agent is selected from the group consisting of a peptide, a protein, a chemical, a nucleic acid sequence, a small molecule, and a biological agent.

67. The method of claim 63, wherein the agent is a drug.

68. The method of claim 67, wherein the agent is an antibiotic or a chemotherapeutic agent.

69. A kit comprising a container containing a host cell of claim 49 and instructions for use of the cell for measuring cell proliferation.

70. The kit of claim 69, further comprising a container containing coelenterazine.